

ORIGINAL

Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of:

Guidelines for Evaluating the
Environmental Effects of
Radiofrequency Radiation

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ET Docket No. 93-62

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JAN 25 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

COMMENTS OF TELOCATOR

**TELOCATOR, THE PERSONAL
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ASSOCIATION**

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SUMMARY

Telocator, the Personal Communications Industry Association ("Telocator") supports the Commission's proposal to update its rules to reflect the newly revised guidelines for radio frequency (RF) exposure. As discussed herein, the ANSI/IEEE C95.1-1992 guidelines are the most comprehensive, up-to-date, consensus statement of the scientific community regarding the effects of human exposure to RF energy. Consequently, the guidelines provide an appropriately sound foundation for discharging the Commission's obligations under the National Environmental Policy Act.

There are, however, several policy issues that are raised by the implementation of the revised standards. Due to changes in the scope of the exemption for low power devices and the incorporation of added safety factors for certain radio environments, the Commission should be mindful of the impact of adoption of the new standards on existing services and new Personal Communications Services. Accordingly, Telocator provides below a number of suggestions for applying the new standards to the land mobile community:

- First, due to the extremely low potential for existing and new mobile services to exceed the applicable standards, Telocator believes that compliance burdens should be minimized.**
- Second, given the demonstrated appropriateness and benefits of the low power exclusion for mobile devices and base stations, such exclusions should be retained.**
- Third, appropriate changes to the equipment authorization process can be made for devices that fall outside the scope of the categorical exclusion that will ensure compliance with the new standards and without imposing undue burdens on the wireless industry.**

Telocator's specific suggestions, and its general support of scientifically-derived, consensus standards, is discussed below.

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Telocator, the Personal Communications Industry Association ("Telocator"), hereby comments on the above-captioned *Notice of Proposed Rulemaking*.¹ Telocator commends the FCC for its continued activity in this area and its commitment to resolving sensitive RF exposure issues in a careful, scientific manner. Indeed, Telocator concurs with Commissioner Duggan about the need for sober reflection on RF issues apart from "press scares and media hype."² Telocator discusses below its specific suggestions for implementing and assuring compliance with the revised standards for both existing land mobile services and new Personal Communications Services ("PCS").

I. INTRODUCTION

Under the National Environmental Policy Act (NEPA) of 1969, the FCC must ensure that its regulations and licensing actions do not create conditions that may threaten the human environment. Since 1985, the Commission has addressed this requirement by obligating

¹ 8 F.C.C. Rcd 2849. In a series of Orders, the time for filing comments was extended three times by the Office of Engineering and Technology.

² 8 F.C.C. Rcd at 2862.

FCC licensees and permittees to evaluate their proposed radio stations in light of 1982 guidelines (C95.1-1982) on the effect of RF radiation exposure developed by the Institute for Electrical and Electronic Engineers (IEEE) and adopted by the American National Standards Institute (ANSI).³ In so doing, the Commission exempted certain types of radio transmitters from routine formal NEPA RF radiation filings, including all forms of land mobile base station and mobile transmitters authorized under Parts 22 or 90 of the rules.⁴ This "categorical exclusion" was based in part on the relatively low power and intermittent use transmitters utilized in these services, as well as the inaccessibility of the facilities.⁵ Consequently, the exclusion represents a policy determination by the Commission that the typical operating characteristics of land mobile facilities normally result in minimal possibility that humans would be exposed to RF fields in excess of the standards.

The instant proceeding has been initiated to consider the existing environmental rules in light of the adoption of newly revised guidelines by ANSI/IEEE. After considerable new research and further study, the revised ANSI/IEEE guidelines implement (1) a new division between controlled and uncontrolled RF environments, (2) an additional safety factor for uncontrolled environments, and (3) additional conditions on the use of categorical exclusions for low power devices. Telocator agrees that as scientific investigation refines the appropriate exposure limitations, it is appropriate for the FCC to reflect this new consensus standard in its rules. For this reason, Telocator concurs with the Commission's tentative

³ See Amendment of Part 1, 100 F.C.C.2d 543 (1985).

⁴ See 47 C.F.R. § 1.1307(b) note 1 (1992).

⁵ *NPRM*, 8 F.C.C. Rcd at 2851.

conclusion to adopt the new version of C95.1, as its benchmarks for requiring NEPA submissions.

In this regard, Telocator notes that of all the RF exposure guidelines referenced in the NPRM, the ANSI/IEEE standard is the most recent and comprehensive.⁶ Indeed, the committee that drafted C95.1, IEEE SCC 28, consisting of an international committee of over 120 scientists and engineers, is the most active and current in reviewing scientific literature. In any event, Telocator notes that the actual impact of the other two standards (NCRP and IRPA) is about the same on PCS operations. All three standards are based on a Specific Absorption Rate (SAR) averaged over the whole body of 0.4 W/kg in controlled or occupational situations and 0.08 W/kg in uncontrolled or general public exposure. The plane wave equivalent power densities listed in the three standards as the limits for exposure in the PCS band are about the same, with the variation between the lowest value and the highest about 30% of the mean.⁷ While the IRPA standard does not lengthen the averaging time for general public exposure to 30 minutes, its low power exclusion is a flat 7 watts without any frequency dependency or top cut-off frequency. Thus, the choice of standard will have little direct impact on PCS operations.

While, as discussed above, Telocator generally concurs with the new ANSI/IEEE standards, there are a number of policy issues raised by the implementation of the guidelines for new and existing services. Specifically, Telocator believes that the incorporation of an

⁶ See *id.*, 8 F.C.C. Rcd at 2852-53.

⁷ For occupational/controlled exposures, the ANSI/IEEE C95.1 1992 limit at 1850 MHz is 6.1 mW/cm², 5 mW/cm² in the NCRP standard, and 4.6 mW/cm² for the IRPA standard. In all three standards the limit for the general public/uncontrolled environments is one fifth of the occupational/controlled environment limit.

added safety factor for uncontrolled environments should not effect existing facilities or the majority of mobile devices, since these devices operate well below the applicable exposure levels in even the revised guidelines. Under the circumstances, the Commission's resources are more appropriately allocated to ensuring compliance in other areas. In particular, Telocator believes the low power exclusion remains an important administrative tool minimizing burdens on the FCC and applicants that can continue to be used consistent with the FCC's mandate under NEPA. The specific policy issues raised by these concerns are discussed in further detail below.

**II. DUE TO OPERATIONAL CHARACTERISTICS MINIMIZING
POTENTIAL EXPOSURE, LAND MOBILE SERVICES DO NOT RAISE
CONCERNS EVEN UNDER THE REVISED ANSI/IEEE GUIDELINES**

**A. The Low Power Device Exclusion Is an Important Administrative
Tool that Should Be Retained and Expanded To Encompass New 2
GHz PCS Devices**

Perhaps the most dramatic change in the new C95.1 is the narrowing of the low power exclusion.⁸ Because of the potential for increased power densities at higher frequencies, the 1992 standard reduces the power allowed under the exclusion on portable units as their frequency increases. Furthermore, the low power exclusion does not apply to units operating above 1.5 GHz, including the 1.8-2.2 GHz bands allocated for PCS.⁹ As

⁸ Sections 4.2.1.1 (for controlled environments) and 4.2.2.1 (for uncontrolled environments) of ANSI/IEEE C95.1-1992.

⁹ *Personal Communications Services*, FCC 93-451, ¶ 56 (Oct. 22, 1993) (*PCS Order*).

noted in the *NPRM*,¹⁰ this raises the question of whether the FCC can continue to exempt all Part 22, 90, and 99 devices from the need for RF exposure studies.

The narrowing of the low power exemption could have enormous consequences. If a particular device falls outside the exemption--as some cellular portables may and *all* PCS units will--manufacturers would be required to submit specific absorption rate (SAR) data.¹¹

SAR measurements, however, are not simple, as the IEEE and ANSI admit:

The local SAR values and the SAR distribution in biological objects cannot be measured without producing relatively large measurement uncertainties, regardless of the instrumentation used. . . . Significant errors can occur when SAR is measured, using temperature probes, at a single point in an object with one or more "hot spots" near, but not coincident with the probe tip.¹²

Uncertainties such as this at the very dawn of the personal communications services era could delay or even doom the introduction of these innovative offerings.

As a result, the Commission should ensure that a low power exclusion continues to be available to new PCS manufacturers and licensees. Telocator understands that the Commission has already sought clarification from the IEEE Standards Board on this issue. Specifically, in a letter from Dr. Stanley,¹³ the Commission requested that the board address the issue of whether low power handheld PCS units need to have SAR measurements or whether the existing formula in the standard's Section 4.2.2.1 of 1.4(450/f) Watts [when f is

¹⁰ 8 F.C.C. Rcd at 2851, 2852.

¹¹ See *PCS Order*, Appendix E at 2.

¹² IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields -- RF and Microwave, ANSI/IEEE Standard C95.3-1992, §§ 3.2.6, 5.5.1 (1992).

¹³ See Letter from Thomas P. Stanley to Andrew G. Salem, cited in *PCS Order*, ¶ 192 n.139.

in MHz] can simply be extrapolated up through 2 GHz, rather than the current cutoff of 1.5 GHz.¹⁴ By letter of October 11, 1993, filed in this docket, Subcommittee IV of IEEE Standards Coordinating Committee 28 stated that the requested interpretation was beyond the jurisdiction of that subcommittee but expressed the view that the FCC's use of the Section 4.2 formulas "up to a frequency of 2200 MHz" would be conservative. Based on this response, Telocator urges the Commission to adopt the use of the specific formulas for PCS units and thus save manufacturers the substantial efforts needed to conduct SAR studies and the burden on the FCC to review them.

B. Vehicle Mounted Mobiles and Base Stations for Land Mobile Services Pose Minimal Possibilities of Exceeding Applicable 1992 ANSI/IEEE Guidelines for Exposure

The 1992 version of the RF standard reduces the exposure limits for the general public.¹⁵ Nonetheless, there will be very few cases where mobile (vehicle mounted) radios or base stations will cause exposure anywhere near the standard. Even with the higher powers of mobile and base stations, the "standoff" distances, *i.e.*, the distance from the transmitting element at which the exposure meets the limits, are not very large. For example, at 1.85 GHz the standoff distance for a 2 Watt (continuously operating) mobile--the

¹⁴ It would also be useful for Standards Coordinating Committee 28 to explicitly state in Section 4.2.2.1 (and in corresponding Section 4.2.1.1 for controlled environments) that the radiated power limit is averaged over 30 minutes (6 minutes for controlled environments). Although a careful reading of Sections 4.2.2 and 4.2.2.1 makes it clear that the averaged power is intended, more explicit wording would eliminate confusion. Compare Section 4.2.2.1 (requiring that the provision be read "consistent with the provisions of 4.2.2") with Section 4.2.2 ("The averaging time for SARs is as indicated in Table 2 [30 minutes]").

¹⁵ The 1992 standard generally does cut the exposure limit for uncontrolled environments (by a factor of five for devices operating in the band 300-1500 MHz), but it also increases the averaging time from 6 minutes to 30 minutes. This further reduces the probability that any mobile radio transmitters will actually cause exposure above the limits in ANSI/IEEE C95.1-1992.

maximum permitted under newly adopted Part 99--is less than 5 inches.¹⁶ Even considering a 100 Watt (EIRP) continuously operating base station--again the maximum allowed in PCS--the distance is under 3 feet.¹⁷ With these short distances, and the even shorter distances when one considers time averaging and other factors,¹⁸ there is no need to require the submission of engineering analysis with each license application for a base or mobile. This is especially true given that the ANSI/IEEE standard has a built-in safety factor of 10 times for controlled environments and 50 times for uncontrolled environments.¹⁹

¹⁶ As discussed in Appendix E of the *PCS Order*, the formula for standoff distance is:

$$D_{cm} = \sqrt{(Power_{mw} \times Gain) / (4\pi \times (\frac{f_{MHz}}{1500}))}$$

Here, Power x Gain, or EIRP, is equal to 2 Watts or 2,000 mW and $f = 1850$ MHz.

¹⁷ The powers given are for EIRP, the distances are for uncontrolled environments, and no ground reflection is assumed (since the ground will be much further away from an antenna on the top of a vehicle). The powers chosen are the maximum EIRP authorized by the *PCS Order*, § 156. The distances at 850 MHz are also very small. For a 7 Watt ERP mobile the distance is about one foot, and for a 1 kW EIRP base station, the distance is only about 7 feet.

¹⁸ In actual practice, the standoff distance will generally be much lower than these values for a variety of reasons including that the calculations are for a 100% duty cycle, *i.e.*, no time averaging is assumed; the actual antenna patterns may attenuate the transmissions in the direction of interest; in some circumstances, the higher limits allowed for partial body exposure in Section 4.4 may be applicable; and even when the formal conditions of Section 4.4 do not apply, the basis for Section 4.4 (that the exposure limits of Tables 1 & 2 are based on "spatial averages of power density . . . over an area equivalent to the vertical cross-section of the human body") will result in exposures that are below the requirements of Sections 4.2.1 or 4.2.2.

¹⁹ C95.1-1992 at 23.

The fact that workers may come in contact with towers or mobiles for relatively prolonged periods--as noted by the *NPRM*²⁰--does not change this analysis. With respect to radio technicians working on base stations--a controlled environment--nothing has changed. At present, land mobile services at 800/900 MHz are categorically excluded from demonstrating compliance for exposure levels that are identical to the "new" ANSI/IEEE limits for controlled environments. There is no reason to remove this exemption now. Indeed, the situation for PCS, for example, is better than existing services because the recommended exposure levels are more permissive at higher frequencies while maximum PCS power levels are lower than for many 800/900 MHz services.

It is also Telocator's understanding that individual carriers have developed procedures and practices to ensure that worker exposure is below applicable limits. Land mobile communications companies operating high powered base stations, for example, can shut down facilities any time technicians are working in close proximity to the antennas. RF protective clothing is also available to minimize exposure. Thus, excluding land mobile radio services (including PCS) from the categorical exclusion because of the possibility of exposure by employees at high power base stations would result only in a significant increase in paper work without any significant impact on actual exposures.

²⁰ *NPRM*, ¶ 21.

In this regard, the *NPRM* also asks whether C95.1 is sufficiently precise in distinguishing between so called "controlled" environments (typically, workers or others that have reason to know that they are being exposed to RF radiation) and "uncontrolled" environments (the general public, including many land mobile transceiver users).²¹ Telocator believes that the ANSI/IEEE standard itself clearly defines controlled and uncontrolled environments²² so that separate FCC action is not needed.

III. DUE TO THE EXTREMELY LIMITED POTENTIAL FOR LAND MOBILE DEVICES TO EXCEED THE NEW GUIDELINES, COMPLIANCE BURDENS SHOULD BE MINIMIZED

The *NPRM* raises a number of issues with regard to assuring compliance with new ANSI/IEEE guidelines. Due to the very limited potential for the majority of land mobile base stations and mobile devices to exceed relevant ANSI/IEEE exposure levels, Telocator believes that compliance burdens should be minimized to the extent possible. Indeed, Telocator does not believe any changes in the current processes are warranted or necessary, except with regard to the low power device exclusion.

Specifically, as discussed above, proposals to divide mobile units into controlled and uncontrolled operating environments and other conditions could potentially increase the number of situations where land mobile devices are not categorically excluded from environmental processing. Importantly, however, these situations are easily identifiable, and provide no basis for altering the categorical exclusion more generally. As the Commission

²¹ *NPRM*, 8 F.C.C. Rcd at 2851.

²² See Definitions in Section 2 (at 9, 12) and the discussion in Section 6 (at 23).

has observed, a categorical exclusion does not exempt any device from appropriate environmental processing in any specific instance where further investigation is deemed necessary to comply with NEPA requirements.

In cases where a mobile is outside the scope of a categorical exclusion, the NPRM questions which entity should be responsible for demonstrating compliance. Telocator believes that there is a straightforward way for the Commission to meet its responsibilities under the NEPA while minimizing unnecessary burdens upon the Commission and its licensees. As suggested in the NPRM,²³ Part 2 should be modified so that any manufacturer of a portable radio unit²⁴ that does not fall under the low power exclusion, must submit, as part of its equipment authorization submission, a technical showing that its operation results in RF exposures within the limits of ANSI/IEEE C95.1-1992.²⁵

Linking the requirement for a technical showing to the equipment authorization procedure is preferable to linking it to licensing procedures for several reasons. First, it is the manufacturer of the portable unit who controls the design of the unit -- a major determinate of the RF exposure created by the unit. Second, is the reduction in paper work. There will be far fewer applications for equipment authorization than there will be for licensing. Third, system operators have limited means for policing the types of CPE used on

²³ 8 F.C.C. Rcd at 2851.

²⁴ This is intended to include "handhelds" and "luggables," *i.e.*, units whose active radiating element will regularly be close to the body of the user.

²⁵ In actual practice this will normally require submitting SAR measurements made with human phantom models to show that the limits in Section 4.2.1(a) [for controlled environments] or Section 4.2.2(a) [for uncontrolled environments] of the standard are met. See Section 5.5, Internal Field Measurement Procedures (SAR) and Appendices C&E of IEEE C95.3-1991. In some cases, where the exception for exposure of the eyes and testes is not applicable, the higher limits of Section 4.4 of C95.1-1992 (Relaxation of Power Density Limits for Partial Body Exposures) will be applicable.

their networks. Fourth, the public interest is served by barring the sale of CPE devices that do not meet the standard. The best way of achieving such a bar is the equipment authorization process.

In addition, rather than making judgments on whether each piece of equipment (especially handhelds) should meet the standards for controlled or uncontrolled environments, the FCC should simply mandate that portable units that only meet the limits for controlled environments have suitable instructions in the user manual and other appropriate warnings.²⁶ Such an approach would be analogous to the Commission's requirement that manufacturers of Class A digital devices include suitable warning in their user manual that the devices are not intended for a residential environment.²⁷ If, again, made a condition precedent to type acceptance, this would minimize the Commission's paperwork burden while ensuring that consumers have all relevant information.²⁸

²⁶ In actual use, satisfying the standards for controlled environments may be entirely adequate for situations where the PCS service is tailored to satisfy the communications needs of industrial or business users.

²⁷ 47 C.F.R. § 15.105(a).

²⁸ Telocator notes that the NPRM (8 F.C.C. Rcd at 2851 n.16) asks whether there are any non-employees for whom exposure at the controlled environment limits would be applicable. If by non-employees one includes anyone not a direct employee of the company owning the transmitter, then there clearly are lots of cases where employees of a vendor, joint partner, customer, etc., could easily be cognizant of their exposure to RF fields. Telocator also note that the standard itself points out at least one case where employment status is irrelevant -- amateur radio operators (at 24 of the Standard). Rather than try to anticipate every situation, the Commission should rely on the clear intent of the standard. Other than for "transient passage," the personnel exposed to fields in excess of those allowed for uncontrolled environments need to know they are potentially subject to RF fields of magnitudes above routine background levels.

As a final matter, by tying RF radiation to the equipment authorization process, the Commission also could resolve an unstated but real industry concern about the new rules. At present, there are tens of millions of portable land mobile units already in the marketplace, such as handheld cellular telephones. Telocator believes that all existing equipment authorizations should be grandfathered, with most falling within the low power exception. After the date of adoption of the rules formulated in this proceeding, new devices subject to equipment authorization should be required to comply with the 1992 version of C95.1. This would provide the industry with a sufficient period for transition to the new requirements.

IV. CONCLUSION

Telocator supports the FCC's efforts to monitor exposure to RF energy in a careful, scientific manner and to modify its rules to keep up to date with the current best efforts of the scientific community. Telocator therefore endorses the Commission's proposal to replace the reference in its rules to the older 1982 ANSI standard on RF exposure with the new 1992 version. In so doing, however, the Commission should ensure that new standards do not cause unnecessary disruption to the development of existing and new wireless services by continuing its existing policy of recognizing that certain transmitting devices have very limited potential to exceed applicable RF exposure guidelines. In particular, existing categorical exclusions should be retained for land mobile services, and efforts should be made to extend the reach of such exemptions to new Personal Communications Services. Moreover, to the extent that any Part 22, Part 90, or Part 99 devices fall outside such exemptions, in recognition of the low potential for actually exceeding the applicable RF

standard, the FCC should make appropriate changes to the equipment authorization process to minimize compliance burdens on manufacturers.

Respectfully submitted,

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